KENDRIYA VIDYALAYA SANGATHAN ERNAKULAM REGION

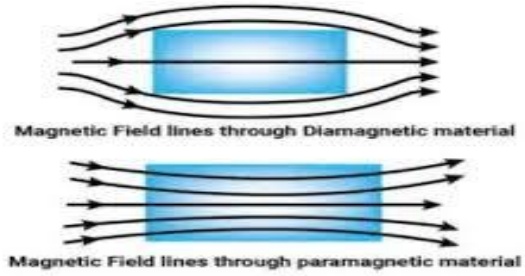
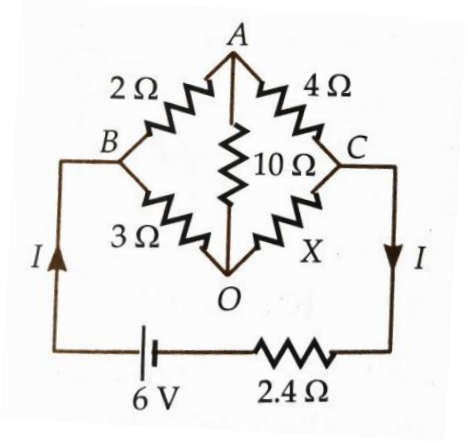
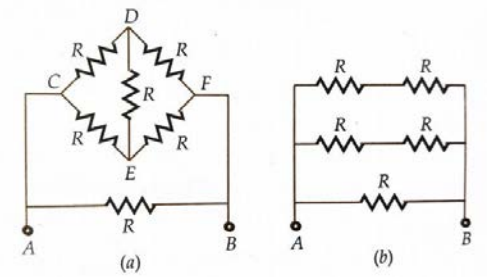
CODE NUMBER: 12PB25PHY04

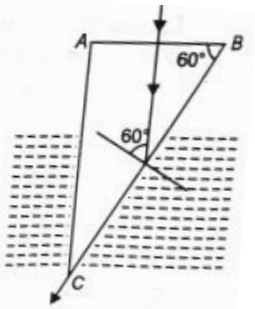
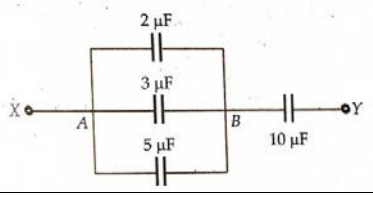
PRE-BOARD EXAMINATION 2025-26

CLASS: XII SUBJECT: PHYSICS (042)

MARKING SCHEME

Q. No	Value Points	Marks
	SECTION-A	
1	C	1
2	D	1
3	A	1
4	B	1
5	D	1
6	C	1
7	C	1
8	B	1
9	B	1
10	A	1
11	A	1
12	D	1
13	A	1
14	B	1
15	A	1
16	C	1
	SECTION-B	
17	(i) Foce at the centre of the shell = 0 Force on the charge 2Q kept at A , $F = \frac{3Q^2}{4\pi\epsilon_0 r^2}$ (ii) Electric flux through the shell = $\frac{Q}{2\varepsilon_0}$	1/2 1/2 1

18 (I)		1 1
18 (II)	Dia magnetic material Any two correct properties	1 1/2 + 1/2
19	Effective resistance = 20 Ω Current, I = 0.1 A	1 1
20 (I)	Proof	2
20 (II)	Any two characteristics Microwaves are used in RADAR systems such that they do not diffract as they have short wavelength. Also they have unidirectional property.	1 1
21	$\lambda = \frac{h}{P} = \frac{h}{\sqrt{2mK}}$ i.e, $\lambda \propto \frac{1}{\sqrt{m}}$ $\frac{\lambda_p}{\lambda_\alpha} = \sqrt{\frac{m_\alpha}{m_p}} = \sqrt{\frac{4m_p}{m_p}} = 2:1$	1 1
SECTION-C		
22 (I)	The equivalent circuit for the given network is shown in figure: As no current flows through the section AO, so the given circuit is a balanced Wheatstone bridge. Hence X = 6 Ω The resistance of 10 Ω in section AO is not effective. Total resistance in the circuit= 6 Ω Current, I = 1 A 	1 1 1
22 (II)	The equivalent circuits are shown in figure. The resistance R in arm DE of the balanced Wheatstone bridge is ineffective. The equivalent resistance R' across AB is given by R' = R/2 Current through arm AB = 2E/R Current through arm DE = 0 	1 1 1

23	Correct derivation on the axial line Expression for magnetic field at the centre	2 1
24	Derive, e = -Blv	3
25	The ray of light is going from glass to liquid. Now, $_{l}\mu_{g} = {}_{l}\mu_{a} \times {}_{a}\mu_{g} = \frac{{}_{a}\mu_{g}}{{}_{a}\mu_{l}} = \frac{3/2}{{}_{a}\mu_{l}}$ $_{l}\mu_{g} = \frac{1}{\sin i_c}$ $\therefore \quad \frac{3}{2({}_{a}\mu_{l})} = \frac{1}{\sin 60^\circ} = \frac{2}{\sqrt{3}}$ $\therefore \quad {}_{a}\mu_{l} = \frac{3}{2} \times \frac{\sqrt{3}}{2} = \frac{3\sqrt{3}}{4} = 1.3$ 	1 1 1
26	Huygen's principle Correct diagram Derivation of Snell's law	1 1 1
27	E=hc/λ = 4.5 eV Transition B will result in the emission of photon of wavelengh 275 nm	2 1
28	Correct diagram explanation	$1\frac{1}{2}$ $1\frac{1}{2}$
	SECTION-D	
29	I. B II. C III. B IV. C	1 1 1 1
30	I. When temperature increases in a semiconductor, the conductivity of the semiconductor increases as more electrons gains energy to cross the energy gap.	2
	II. Insulator	1
	III. Zero	1
	SECTION-E	
31(I)	(A) Correct derivation (B) On solving, effective capacitance , C=20 μF ∴ Charge q=CV - 2 mC	3 1 1
31(II)	(A) Correct derivaton (B) Equivalent circuit diagram On solving, equivalent capacitance , C=5 μF 	2 2

	(C) Energy=$Q^2/2C$ When separation is increased capacitance will increase and charge will remain same. Therefore energy stored in capacitor will decrease.	1
32(I)	(A) Correct derivation (B) (i) $I_0 = e_0/R$ =7.07 A (iii) Power dissipated = $(200)^2/40$ = 1000 W	3 1 1
32(II)	(A) Correct phasor diagram Correct derivation for Z (B) $e = \sqrt{V_R^2 + (V_L - V_C)^2}$ =$\sqrt{80^2 + (100-40)^2}$ =100 V Cos ϕ = $\frac{V_R}{\sqrt{V_R^2+(V_L-V_C)^2}}$=80/100 = 0.8	1 2 1 1
33(I)	(A) Correct ray diagram Magnifying power, M = $-f_o/f_e$ Two limitations of refracting telescope over reflecting telescope (B) u = +12 cm, f = -16 cm $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ On solving, v = 48 cm	$1\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}+\frac{1}{2}$ 1 1
33(II)	(A) Correct Ray diagram Correct derivation (B) $\frac{1}{f} = (n-1)(\frac{1}{R_1} - \frac{1}{R_2})$ N=1.55, f=10 cm, R_1=R, R_2= -R On solving, R = 11 cm	1 2 $\frac{1}{2}$ $\frac{1}{2}$ 1